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M. W. Boyer, General Manager

October 13, 1952

John C. Bugher, Director, Division of Biology and Medicine

MONTHLY STATUS AND PROGRESS REPORT, SEPTEMBER 1952 -
DIVISION OF BIOLOGY AND MEDICINE

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Transmitted herewith is the Monthly Status and Progress Report for this Division covering the month of September 1952.

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MONTHLY STATUS AND PROGRESS REPORT

Division of Biology and Medicine

MONTH OF SEPTEMBER, 1952

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Industrial Health ActivitiesInvestigation of Health Conditions at Ames Laboratory.

(CONFIDENTIAL) During the past several months attention has been drawn to possible radiation hazards associated with the production of thorium by the Ames Laboratory. Recent investigations disclosed that, within the Laboratory, conditions existed which, if permitted to continue over long periods of time, would become hazardous to health. It was also ascertained that, as a result of the discharge of chemical wastes into the city sewerage system, mesothorium was found to accumulate in sludge removed by the city sewerage plant. However, it was found that the mesothorium occurred in a combination of concentration and quality too low to present a hazard from possible inhalation from use of the sludge as fertilizer, or from external radiation. It was estimated that, if the mesothorium were present in drinking water in a concentration equal to its average concentration in the liquid sewage before treatment at the city sewerage plant, one could use the water as a sole source of supply for approximately five years without exceeding the estimated maximum permissible content of 0.05 microcuries in the body.

Due to technical difficulties, production of the plant was shut down July 28, 1952, and advantage was taken of this shutdown to investigate more thoroughly and to increase control of radioactive materials, especially within the plant.

The plant resumed production on a limited basis on August 25, 1952 to demonstrate the efficacy of changes in the production process which had been effected during the shutdown. It is expected that the operational level will be brought up to full capacity within the near future.

Weapons Test Activities

Fall-out Monitoring Program. [REDACTED] The extensive fall-out monitoring operations during the TUMBLER-SNAPPER tests have provided valuable and useful data on the amounts of air-borne and settled dust activity resulting from fall-out. Consequently, plans have been made to expand the monitoring program into a world-wide operating network for the coming IVY test series. The network will extend across the continental United States, Central and South America, the Pacific, and through Europe and Africa. Administration of the project will be handled by the Health and Safety Division of the New York Operations Office, in cooperation with the U.S. Weather Bureau, Air Force, Navy, Coast Guard, Department of State. The samples collected at the various stations will be forwarded to the NYOO Laboratory for counting, as in the past.

Civil Effects Program for Operation KNOTHOLE-UPSHOT. [REDACTED] The Test Director for the KNOTHOLE-UPSHOT operations (scheduled for spring of 1953 at the Nevada Proving Grounds) has appointed Mr. Robert L. Corabie, Chief, Civil Defense Liaison Branch, Division of Biology and Medicine, as Director, Civil Effects Group, for that test series. In this capacity he will supervise all civil effects programs and projects proposed by the AEC, FCDA, and other civilian agencies.

The Civil Effects Program for Operation KNOTHOLE-UPSHOT falls into two categories: (1) a biological dosimetry program; (2) testing of communal-type shelters.

The biological dosimetry program involves biological experiments, using mice, Tradescantia, etc., as biological dosimeters, for the purpose of determining (a) the neutron fluxes which occur within the communal-type shelters; and (b) the accuracy of the new Failla neutron dosimeter for estimating the relative biological equivalents of neutron radiation.

The communal shelter program will consist of two prototype shelters similar to those tested at Operation BUSTER but with redesigned entrances to provide improved protection against radiation and blast effects. The purpose of the tests will be to confirm the validity of theoretical entrance design configurations. Scale model shock-tube tests have been conducted at the Ballistics Research Laboratory, Aberdeen Proving Ground, with encouraging results.

The Radiation Instruments Branch has provided for the physical measurement of nuclear radiation levels within the test shelters. Arrangements have been made with the National Bureau of Standards to provide film badges for measuring the gamma radiation dosage. Tissue equivalent ionization chambers for neutron measurements are to be fabricated by the Federal Telecommunications Laboratory, and it is planned that gold and sulphur neutron activation measurements will be conducted by the Los Alamos Scientific Laboratory.

Research Activities

University of Tennessee Agricultural Research Program.
(UNCLASSIFIED) The following summarizes briefly recent progress reported in several of the project components of the University of Tennessee Program:

Project 2 - When Cesium 137 is administered intravenously to cattle, it is rather rapidly removed from the liquid plasma of the blood by the red blood cells but may remain in the cells for a long time. Approximately 9-12% of the material remains in the body after 56 days, with highest concentrations in the muscle and lowest concentrations in bone. Because of the energy of the emitted radiations, this distribution means that a large portion of the total would be received by the body.

Project 5 - Tests of radiation effects on reproductive function in rabbits indicated that between 50r and 100r X-rays caused a demonstrable increase in fetal mortality.

Project 10 - Analysis of data on large mammals--swine and burros--exposed to chronic irradiation from Co⁶⁰ and Ta¹⁸² has led to certain preliminary conclusions:

- a. The size of the animal irradiated has no detectable effect on survival.
- b. Males appear to be slightly more resistant than females.
- c. Animals dying following whole-body irradiation gave histological evidence of hyperthyroidism and, in females, an alteration in function of the anterior pituitary.
- d. Studies of blood clotting changes indicated that radiation produces (a) prolongation of whole blood clotting, and (b) failure of clot retraction for a week after radiation.

- e. Values for alkaline phosphatase dropped after the first week following radiation.

There appears to be no general injury to which these changes can be related.

Radiation Instrument Coordination Program

Survey of Radiation Instrument Industry. (UNCLASSIFIED) As part of the program of re-evaluating the AEC relationship with the radiation instrument industry, some 75 companies were sent questionnaires requesting information on the gross sales of their instruments, percentage breakdown of sales between AEC, the Military, hospitals, civil defense, etc., income from research and development, and other associated activities. There has been about a 50 per cent response from the industry. A preliminary evaluation of these data indicates that the 1951 gross sales were about double that of 1950, or, approximately 14 million in 1951 as compared with 6.8 million in 1950.

Radiation Instrument Catalog. (UNCLASSIFIED) Final editing has been completed, and final mock-up has been sent to Oak Ridge for composing and printing. The first printing of the catalog is scheduled to be completed in November, 1952. The compilation will include 664 catalog items representing products of 80 companies.

Visitors. (UNCLASSIFIED) During the month of September, the RIB received 19 visitors, not including persons from other AEC offices and from NBS. Fifteen of these 19 were representatives from the following industrial concerns:

Nassau Distributing Company
Pacific Mercury Television
Broadway Maintenance Corporation
Gray Manufacturing Company
EL-Tronics, Inc.
Nuclear Instruments and Chemical Corporation
Minneapolis-Honeywell Regulator Company
Brown Instrument Division of Minneapolis-Honeywell
Radio Corporation of America, Tube Department
Gibbs Manufacturing and Research Corporation
Stratex Instrument Company
Victoreen Instrument Company
Nuclear Measurement Corporation